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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/002,157	12/05/2001	Kwang Hyup An	3449-0184P	2260
2292	7590	10/22/2003		
BIRCH STEWART KOLASCH & BIRCH PO BOX 747 FALLS CHURCH, VA 22040-0747				
			EXAMINER KRISHNAMURTHY, RAMESH	
			ART UNIT 3753	PAPER NUMBER

DATE MAILED: 10/22/2003

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[Percy Square]  
02/22/04

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/002,157

Applicant(s)

AN ET AL.

Examiner

Ramesh Krishnamurthy

Art Unit

3753

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 06 August 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1 - 17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 - 17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 06 August 2003 is: a) ☐ approved b) ☒ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

This office action is responsive to amendment filed 08/06/2003.

**Claims 1 – 17 are pending.**

1. Figures 1 and 2A – 2D should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The proposed label "Related Art" is not acceptable since only that which is old is illustrated in these figures. The objection to the drawings will not be held in abeyance.

The proposed corrections to Figs. 3A, 3B, 5, 10A and 10 B are approved.

2. Applicant is advised that should claim 9 be found allowable, claim 10 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein

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were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 1 – 3, 7, 11 and 14 – 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Prior art (Figs. 1, 2A – 2D and specification page 1, line 12 – page 4, line 1 in view of Dennedy (US 1,416,696).

The Prior art (Figs. 1, 2A – 2D and specification page 1, line 12 – page 4, line 1) discloses a valve plate structure comprising:

An open/shut means (20, 26) for inhaling and discharging fluid through movement of piston (19); and

A valve plate (22) including a suction port (221) coupled with the open/shutting means (20) through piston movement, a discharge port (222) for discharging fluid.

The prior art (Figs. 1, 2A – 2D and specification page 1, line 12 – page 4, line 1) discloses the invention with the exception disclosing a plurality of continuous grooves provided to surround the outside of the suction port or the discharge port.

Dennedy discloses a compressor with a discharge port (16) open/closed by a valve member (21) wherein the valve seat is provided with a plurality of continuous grooves for the purpose of lessening the stiction between the valve (21) and the valve seat associated therewith.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided the suction port or the discharge port with a plurality of continuous grooves surrounding the port for the purpose of lessening the stiction between the valve and the valve seat associated therewith, as recognized by Dennedy ('696).

Regarding Claim 2, it is noted that the device disclosed in the Prior Art (Figs. 1, 2A – 2D and specification page 1, line 12 – page 4, line 1) discloses:

A suction valve (20) having a suction plate (201) at a position corresponding to suction port (221) of the valve plate (22) to intake fluid through piston movement;

A discharge valve (26) having a discharge plate (261) at a position corresponding to discharge port (222) of the valve plate (22) to discharge fluid; and

A head cover (28) having a suction tube (281) formed at a position corresponding to the suction port (221) and a discharging tube (282) formed at a position corresponding to the discharging port (222) of the valve plate (22) (see page 2 of the specification, lines 14 – 19)

Regarding Claim 3, it is noted that the compressor of the prior art (Figs. 1, 2A – 2D and specification page 1, line 12 – page 4, line 1) discloses the fluid to be a coolant (page 1, line 24).

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Regarding claim 11, it is noted that the open/shut means in the device according to the Prior Art (Figs. 1, 2A – 2D and specification page 1, line 12 – page 4, line 1) is operated via pressure difference resulting from the piston movement.

Regarding claim 14, it is noted that is essentially a combination of the claims 1, 2 and 3 whose individual rejections have been set forth above. Recitations pertaining to the linear movement of the piston are disclosed in the Prior art (Figs. 1, 2A – 2D and specification page 1, line 12 – page 4, line 1) specifically at page 1, line 21 – page 2, line 1).

Regarding claim 15, it is noted that the prior art (Figs. 1, 2A – 2D and specification page 1, line 12 – page 4, line 1) discloses (Page 1, lines 16 – 18) that the valve plate, discharging valve, the suction valve and the head cover are coupled via a bolt.

6. Claims 4 – 6 and 8 – 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Prior art (Figs. 1, 2A – 2D and specification page 1, line 12 – page 4, line 1 in view of Dennedy (US 1,416,696) as applied to claims 1 – 3, 7, 11 and 14 – 17 and further in view of Kapadia (US 5,228,468).

The combination of Prior Art and Dennedy as set forth above, discloses the claimed invention with the exception of explicitly disclosing the specific geometric properties of the grooves.

Kapadia ('468) discloses a valve plate structure comprising:

An open/shut means (10) for inhaling and discharging fluid in compressible fluid handling apparatus (13) through ports in a valve plate or valve seat (14), with a plurality

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of cavities (18) surrounding the port (16) for the purpose of damping the progress of the valve member towards its seat thereby minimizing the contact shock between the valve and the seat (Col. 1, lines 52 – 55). While Kapadia discloses the use of cavities, the teachings provided therein are also applicable to grooves since grooves are nothing more than continuous realization of a series of cavities, with the grooves representing continuous plenum chambers whereas cavities represent discrete pockets of plenum chambers.

Regarding claim 4, it is noted that Kapadia ('468) discloses that the plurality of cavities (18) and thus the grooves could have different widths in order to vary the damping effect (Col. 3, lines 1, 2).

Regarding claims 5, 6, 8, 9 and 10 it is noted that Kapadia ('468) discloses that the plurality of cavities (18) could have different geometries in order to vary the damping effect (Col. 3, lines 1, 2). Kapadia ('468) further discloses (Col. 2, lines 31 – 33) that cavities with non-circular shapes could be provided.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided in the combination of Prior Art and Dennedy, grooves with various geometric properties for the purpose of providing desired damping effect as recognized by Kapadia.

7. The indicated allowability of claims 12 and 13 is withdrawn in view of the newly discovered reference(s) to Erickson (US 5,452,994). Rejections based on the newly cited reference(s) follow.

8. Claims 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over the Prior art (Figs. 1, 2A – 2D and specification page 1, line 12 – page 4, line 1 in view of Erickson (US 5,452,994).

The prior art (Figs. 1, 2A – 2D and specification page 1, line 12 – page 4, line 1) discloses the invention with the exception disclosing a spiral groove provided to surround the outside of the suction port or the discharge port.

Erickson discloses a spiral groove (134, 136) provided on the outside of the port (102) associated with the valve (56) for the purpose of providing a reduction in stiction forces between the valve and its seat.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided a spiral groove provided to surround the outside of the suction port or the discharge port for the purpose of providing a reduction in stiction forces between the valve and its seat, as recognized by Erickson.

9. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over the Prior art (Figs. 1, 2A – 2D and specification page 1, line 12 – page 4, line 1 in view of Erickson (US 5,452,994) as applied to claim 12 and further in view of Kapadia (US 5,228,468).

The combination of Prior Art and Erickson as set forth above discloses the invention with the exception of explicitly disclosing the width of the groove to increase.

Kapadia discloses (as discussed above) the use of plenum chambers of varying widths associated with the suction/discharge ports for the purpose of providing desired damping of the valve movement.



It would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided in the combination of Prior Art and Erickson, a spiral groove whose width increases as it increases outward from the port, for the purpose of providing desired damping of the valve movement, as recognized by Kapadia.

***Response to Arguments***

10. Applicant's arguments with respect to claims 1 - 17 have been considered but are moot in view of the new ground(s) of rejection.

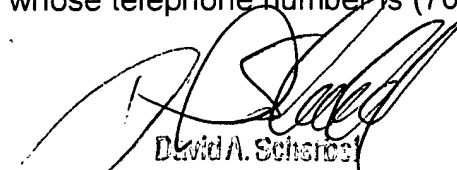
11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Ames discloses the use of a plurality of grooves around a port associated with a piston. Bunn et al. discloses a plurality of grooves around a port associated with a compressor valve. Hollenstein discloses an overpressure valve having a plurality of grooves near the valve seat. Tark et al. discloses the use of a spiral damping element.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ramesh Krishnamurthy whose telephone number is (703) 305 - 5295. The examiner can normally be reached on Monday - Friday from 8:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David A. Scherbel, can be reached on (703) 308 - 1272. The fax phone number for the organization where this application or proceeding is assigned is (703) 872 - 9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308 - 0861.

Ramesh Krishnamurthy  
Examiner  
Art Unit 3753  
October 17, 2003

  
David A. Scherbel  
Supervisory Patent Examiner  
Group 3700